



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re patent application of

Thomas BUCHBERGER et al

Before the Board of Appeals

Serial No. 10/549,576

Art Unit: 3753

Filed: November 17, 2006

Examiner: A. Chaudry

For: PRESSURE LIMITING VALVE

APPELLANT'S BRIEF (37 CFR 41.37)

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Date: April 15, 2011

Sir:

This Brief is filed in support of the Notice of Appeal filed on December 17, 2010,  
appealing the Examiner's decision of making final a rejection of claims 22, 23, 25-27, 29-35 and  
37-45.

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Serial No. 10/549,576

Appellants' Brief dated April 15, 2011

In support of Appeal filed December 17, 2010

I - REAL PARTY IN INTEREST

The real party in interest in this appeal is:

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## II - RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal, there are no such appeals or interferences. None

### III - STATUS OF CLAIMS

#### A. TOTAL NUMBER OF CLAIMS IN APPLICATION - Twenty (21).

Claims in the application are: 22, 23, 25-27, 29-35 and 37-45.

#### B. STATUS OF ALL THE CLAIMS

1. Claims canceled: 1-21, 24, 28 and 36.
2. Claims withdrawn from consideration but not canceled: None.
3. Claims pending: 22, 23, 25-27, 29-35 and 37-45.
4. Claims allowed: None.
5. Claims rejected: 22, 23, 25-27, 29-35 and 37-45.

#### C. CLAIMS ON APPEAL

The claims on appeal are: 22, 23, 25-27, 29-35 and 37-45.

#### IV - STATUS OF AMENDMENTS

An amendment was filed on October 19, 2010, after the final rejection. An Advisory Office action was mailed on November 3, 2010, refusing entry of the after-final amendment. Thus, no changes have been made to the claims that were finally rejected and the last entered amendment containing the claims on appeal is the amendment filed on June 16, 2010.

## V - SUMMARY OF CLAIMED SUBJECT MATTER

In the following summary, all references to pages and lines can be found in the original English-language specification filed on September 19, 2005. However, it should be noted that the original English-language specification contained a number of minor errors that were corrected by the preliminary amendment also filed on September 19, 2005. The references to pages and lines in the following summary are intended as examples of where the claim language may be found in the specification and are not intended to be exclusive.

Independent claim 22 is directed to a pressure limiting valve (10 - Fig. 1), consisting of

- a single piece valve holder (1),

- a single piece valve insert (2) connected to the valve holder (1),

- a single piece valve piston (3) supported slidably in the valve insert (2),

- a compression spring (5), acting upon the valve piston (3) with a pressure force acting in the closing direction (pg. 4, ll. 12-14), and

- a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (pg. 4, ll. 9-12), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a, 1b) merge with one another in steplike fashion (pg. 3, ll. 3-6 of ¶ 0020), and wherein the subregion (1b) of the valve holder (1) embraces the valve insert (2) from the outside (pg. 3, ll. 9-

10 of ¶ 0020), so that the steplike transition of the valve holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert and the valve holder (Fig. 1), wherein the valve piston (3) has an end surface and a outer cylindrical circumferential surface (Fig. 1), and at least one flat place (3a, 3a.1, 3a.2, 3a.3 - Figs. 1, 3, 4 and 7) is provided on the outer cylindrical circumferential surface of the valve piston (pg. 5, ll. 9-12 of ¶ 0021), and wherein the flat places (3a) extend over only a portion of the length of the valve piston (pg. 6, ll. 3-4 of ¶ 0023).

Independent claim 31 is directed to a pressure limiting valve (10 - Fig. 1), consisting of

- a single piece valve holder (1),
- a single piece valve insert (2) connected to the valve holder (1),
- a single piece valve piston (3) supported slidably in the valve insert (2),
- a compression spring (5), acting upon the valve piston (3) with a pressure force acting in the closing direction (pg. 4, ll. 12-14), and
- a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (pg. 4, ll. 9-12), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a, 1b) merge with one another in steplike fashion (pg. 3, ll. 3-6 of ¶ 0020), and wherein the



subregion (16b) of the valve holder (1) embraces the valve insert (2) from the outside (pg. 3, ll. 9-10 of ¶ 0020), so that the steplike transition of the valve holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert and the valve holder (Fig. 1), wherein three flat places (3a, 3a.1, 3a.2, 3a.3 - Figs. 1, 3, 4 and 7) are provided on the outer circumference of the valve piston (pg. 5, ll. 9-12 of ¶ 0021), which flat places are distributed uniformly over the circumference of the valve piston (pg. 5, ll. 10-12 of ¶ 0021), and wherein the flat places (3a) are disposed on the valve piston (3) such that they extend parallel to the longitudinal axis of the valve piston (Fig. 3).

Independent claim 44 is directed to a pressure limiting valve (10), consisting of

- a single piece valve holder (1),
- a single piece valve insert (2) connected to the valve holder (1),
- a single piece valve piston (3) supported slidably in the valve insert (2),
- a compression spring (5), acting upon the valve piston (3) with a pressure force acting in the closing direction (pg. 4, ll. 12-14), and

- a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (pg. 4, ll. 9-12), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a,

1b) merge with one another in steplike fashion (pg. 3, ll. 3-6 of ¶ 0020), and wherein the subregion (16b) of the valve holder (1) embraces the valve insert (2) from the outside (pg. 3, ll. 9-10 of ¶ 0020), so that the steplike transition of the valve holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert and the valve holder (Fig. 1), wherein the valve insert (2) has a cup-shaped recess (2a), in which the adjusting shim (4) is slidably supported (pg. 4, ll. 14-15).

Independent claim 45 is directed to a pressure limiting valve (10), consisting of

- a single piece valve holder (1),

- a single piece valve insert (2) connected to the valve holder (1),

- a single piece valve piston (3) supported slidably in the valve insert (2),

- a compression spring (5), acting upon the valve piston (3) with a pressure force acting in the closing direction (pg. 4, ll. 12-14), and

- a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (pg. 4, ll. 9-12), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a, 1b) merge with one another in steplike fashion (pg. 3, ll. 3-6 of ¶ 0020), and wherein the subregion (16b) of the valve holder (1) embraces the valve insert (2) from the outside (pg. 3, ll.

9-10 of ¶ 0020), so that the steplike transition of the valve holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert and the valve holder (Fig. 1), wherein the valve insert (2) has a cup-shaped recess (2a), in which the adjusting shim (4) is slidably supported (pg. 4, ll. 14-15), wherein the diameter of the adjusting shim is greater than the diameter of the steplike transition so that the steplike transition holds the adjusting shim within the cup-shaped recess (pg. 4, ll. 17-22).

Appellants would like to direct the Board's attention and the examiner's attention to dependent claims 29, 30, 37 and 43.

Claims 29 and 30 contain limitations that duplicate limitations recited in claim 31, from which these claims depend. It appears that claims 29 and 30 should have been canceled. Should the prior art rejection to claim 31 be reversed, appellants commit to canceling dependent claims 29 and 30 to avoid the issue that these claims include redundant claim limitations.

In claim 37, the recitation "the outflow opening" lacks proper antecedent basis since claim 35, from which claim 37 depends, uses the phrase *the outflow conduit* to describe the outlet in the valve holder. Should the prior art rejection to claim 31 be reversed, appellants commit to amending claims 37 to correct this oversight.

In claim 43, "the bore" should be "a bore" since claim 31, from which claim 43 depends, does not recite *a bore*. Thus, the recitation "the bore" lacks proper antecedent basis. Should the prior art rejection to claim 31 be reversed, appellants commit to amending claim 43 to avoid this oversight.

## VI - GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 22, 23, 25, 29-31, 33-35, 44 and 45 are unpatentable under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482) and Fountain-Barber (US 3,199,533).

Whether claim 26 is unpatentable under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Lauer et al (US 6,523,913).

Whether claims 32 and 38 are unpatentable under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Jay et al (US 2,672,881).

Whether claims 27, 39, 41 and 42 are unpatentable under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Yie (US 5,241,986).

Whether claim 40 is unpatentable under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Lindeboom (US 3,346,009).

Whether claims 37 and 43 are unpatentable under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Platt et al (US 4,413,646).

## VII - ARGUMENTS

### **Rejection under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482) and Fountain-Barber (US 3,199,533)**

#### Claims 44 and 45

Appellants respectfully submit that the examiner erred in rejecting independent claims 44 and 45 for at least the following reasons: (1) Hirota et al fail to disclose "a single piece valve piston supported slidably in the valve insert" as claimed, (2) Hirota et al fail to disclose "a single piece adjusting shim disposed between the valve piston and the compression spring such that the compression spring is braced on one end on a bottom piece of the valve holder and on the other on a face of the adjusting shim facing away from the valve piston" as claimed (3) the expansion valve of Hirota et al includes an additional element excluded by the transitional language "consisting of" in the claims, (4) the art-recognized equivalent of the valve holder assembly of Caldman et al and the fluid passage opening mechanism of Fountain-Barber has not been established, (5) the proposed combination of references does not result in the claimed invention, and (5) the proposed combination would not have been obvious, as explained below.

The invention of Hirota et al is directed to a structurally simple, noiseless, silent supercooling degree-controlled expansion valve in which vibrations of the valve element induced by the refrigerant flow are suppressed sufficiently without deteriorating the valve performance, i.e., without harming the capacity of the valve to control an essential constant degree of supercooling (col.1, ll. 57-63). As shown in Figs. 1-4, the expansion valve 10 includes a dust

removing filter 11, a cylindrical case 12, a valve element 14, a compression spring 18 and a coil spring seat 20.

On pgs. 2 and 3 of the Final rejection, mailed July 20, 2010, the examiner finds that the Fig. 2 embodiment of the valve in Hirota et al is disclosed as "consisting of" a single piece valve holder (20), a single piece valve insert (12) connected to the valve holder (20), a single piece valve piston (portion of valve element 14 sliding within the smaller diameter portion of valve insert 12) supported slidably in the valve holder (12), a compression spring (18), acting upon the valve piston [with] a pressure force acting in the closing direction, and a single piece adjusting shim (larger diameter portion of valve element 14) disposed (slidably supported in a cup shaped recess in the valve insert 12) between the valve piston and the compression spring (18) such that the compression spring is braced on one end on a bottom piece of the valve holder and on the other on a face of the adjusting shim (14) facing away from the valve piston.

Appellants do not agree with the examiner's analysis and opinion that the portion of the valve element 14 sliding within the smaller diameter portion of the valve insert 2 is a single piece valve piston. Parts 14a and 14c of valve element 14 are the portions of the valve element sliding within the smaller diameter portion of the cylindrical case 12. However, part 14a is described as being *a closing part* and part 14c is described as being *guide legs* (col. 3, ll. 29-33). There is no disclosure or suggestion in Hirota et al that parts 14a and 14c in the Fig. 2 embodiment constitute a piston or function as a piston.

A *piston*, as defined in *Dictionary.com*, is "a disk or cylindrical part tightly fitting and moving within a cylinder, either to compress or move a fluid collected in the cylinder, as air or

water, or to transform energy imparted by a fluid entering or expanding inside the cylinder, as compressed air, explosive gases, or steam, into a rectilinear motion usually transformed into rotary motion by means of a connecting rod."

While at least part 14a of the valve element in the Fig. 2 embodiment appears to be a cylindrical part that moves with the cylindrical case 12, neither part 14a or 14c is disclosed as performing the function of a piston, i.e., compressing or moving a fluid collected in the cylinder or transforming energy imparted by a fluid entering or expanding inside the cylinder into a rectilinear motion. Part 14a, as described in Hirota et al, merely closes upstream-side refrigerant passage 16a, while part 14c guides the closing part 14a between its closed and open positions.

Hirota et al, therefore, do not disclose a single piece valve *piston* supported slidably in the valve insert as claimed. Accordingly, the claim limitation is not met by the reference and claims 44 and 45 are not unpatentable under 35 U.S.C. 103.

Appellants do not agree with the examiner's analysis and opinion that the larger diameter portion of valve element 14 is an adjusting shim. At col. 3, ll. 29-36 of the reference, Hirota et al clearly state that:

Valve element 14 (Fig. 1) has a closing part 14a fitted onto the valve seat 13, a conical part 14b facing said valve seat edge from a downstream side, three guide legs 14c extending through valve seat 13 and along the inner peripheral surface of the upstream-side passage 16a, and three supporting legs 14d protruding downstream and extending along the inner peripheral surface of down-stream passage 16b.

Thus, it is readily apparent from this disclosure that, if the closing part 14a, the conical part 14b and the guide legs 14c, which are located above the larger diameter portion of the valve element

14, and the supporting legs 14c, which is located below the larger diameter portion of the valve element 14, combine to form part of the one piece valve element, the larger intermediate diameter portion of the valve element 14 must implicitly be part of the valve element as well, not a single piece adjusting shim disposed between the valve piston and the compression spring as alleged by the examiner.

Moreover, it is disclosed in ll. 3-6 of paragraph [0021] of appellants specification that the adjusting shim is provided as a means for adjusting the opening pressure of the valve. By means of adjusting shims of different thickness, unavoidable production variations can be compensated for easily. Hirota et al does not disclose nor has the examiner provided any evidence that the larger diameter portion of the valve element 14 adjusts the opening pressure of the valve.

Therefore, it is respectfully submitted that Hirota et al lack any disclosure whatsoever of an adjusting shim for adjusting the opening pressure of the valve. Thus, the examiner's reading of the larger diameter portion of the valve element 14 as being an adjusting shim is incorrect. Accordingly, the recitation in claims 44 and 45 of a single piece adjusting shim disposed between the valve piston and the compression spring such that the compression spring is braced on one end on a bottom piece of the valve holder and on the other on a face of the adjusting shim facing away from the valve piston is not met by Hirota et al. Hence, claims 44 and 45 are not unpatentable under 35 U.S.C. 103.

Furthermore, the examiner has provided no factual basis for concluding that the larger diameter portion of the valve element 14 in Hirota et al is an adjusting shim. The examiner's conclusion that the larger diameter portion of the valve element 14 is an adjusting shim (pg. 3 of



the Final rejection) appears to be based on pure speculation or conjecture, not upon fact. Section II of MPEP 2141 states:

As reiterated by the Supreme Court in *KSR*, the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Obviousness is a question of law based on underlying factual inquiries . . . , and Office personnel fulfill the critical role of fact finder when resolving the *Graham* inquiries. It must be remembered that while the ultimate determination of obviousness is a legal conclusion, *the underlying *Graham* inquiries are factual. When making an obviousness rejection, Office personnel must therefore ensure that the written record includes findings of fact concerning the state of the art and the teachings of the references applied.* In certain circumstances, it may also be important to include explicit findings as to how a person of ordinary skill would have understood prior art teachings, or what a person of ordinary skill would have known or could have done. Factual findings made by Office personnel are the necessary underpinnings to establish obviousness. (Emphasis added.)

In as much as the examiner has failed to provide any evidence or findings of fact to support his conclusion that the larger diameter portion of the valve element 14 of Hirota et al is a single piece adjusting shim disposed between the valve piston and the compression spring, the rejection is improper and should be reversed.

Appellants further submit that claims 44 and 45 include the transitional phrase "consisting of" which defines the scope of the claims with respect to what unrecited additional components or elements are excluded from the claims. MPEP § 211.03. In contrast to the transitional word "comprising" which is open-ended and does not exclude additional, unrecited elements, the transitional phrase "consisting of" is closed-ended and conveys limitation and exclusion. *Norian Corp. v. Stryker Corp.* 363 D.3d 1321, 1331 (Fed Cir. 2004). The transitional

phrase “consisting of” excludes any element not specified in the claims. *In re Gray*, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); *Ex Parte Davis*, 80 USPQ 448, 450, (Bd. App. 1948). In other words, the phrase “consisting of” is a term of patent convention meaning that the claimed invention contains only what is expressly set forth in the claim. See Vehicular Techs. Corp. v. Titan Wheel Int’l, Inc., 212 F.3d 1377, 1382-83 (Fed. Cir. 2000).

Therefore, appellants submit that by using the transitional phrase “consisting of” in claims 44 and 45, the claimed invention, i.e., a pressure limiting valve, contains only the elements expressly set forth in the claims, namely, a single piece valve holder (1), a single piece valve insert (2), a single piece valve piston (3), a compression spring (5) and a single piece adjusting shim (4). Any unrecited additional components or elements are excluded from the claims.

As clearly disclosed in Hirota et al, the expansion valve includes a dust-removing filter 11 attached to an upstream-side half of the expansion valve 10 (col. 3, ll. 10-11 and Figs. 1, 2 and 4) for the purpose of catching rubbish and/or impurities contained in the refrigerant to prevent them from flowing into the expansion valve 10 or into the restricted passage 22 (col. 3, ll. 17-20). The dust-removing filter is clearly a necessary component or element of the expansion valve since removal of debris prevents clogging of the expansion valve and/or the restricted passage. However, the transitional phrase “consisting of” in claims 44 and 45 excludes this additional component or element since the claimed valve is limited to only the five components or elements expressly set forth in the claim, namely, a single piece valve holder (1),

a single piece valve insert (2), a single piece valve piston (3), a compression spring (5) and a single piece adjusting shim (4), as discussed previously.

Therefore, even if the larger diameter portion of the valve element 14 is read as the claimed adjusting shim, as proffered by the examiner, the claim limitations recited in claims 44 and 45 are not met by the reference since the valve of Hirota et al would include a sixth component or element, i.e., the dust-removing filter, whereas the recited "consisting of" phrase limits the claimed pressure limiting valve to the five components or elements expressly set forth in the claims. Accordingly, the rejection of claims 22, 31, 44 and 45 is improper and should be reversed.

On pgs. 3 and 4 of the Final rejection, the examiner finds that the valve holder 20 of Hirota et al has at least two subregions of differing inside diameter, but lacks at least two subregions that merge with one another in a steplike fashion.

The examiner relies on Cadman et al (Fig. 2) as teaching a valve holder 33 having at least two subregions that merge with one another in steplike fashion and that the steplike transition of the valve holder formed by the different diameter regions is seated on valve insert 30 such that the valve insert is received in the second subregion of the valve holder which embraces and surrounds a portion of the valve insert for establishing the connection between the valve insert and the valve holder (pg. 4 of the Final rejection mailed July 20, 2010).

The examiner concludes that it would have been obvious to provide Hirota et al with a valve holder having steplike subregions receiving the valve insert, as taught by Cadman et al, as

an art-recognized equivalent substitute valve housing assembly (pg. 4 of the Final rejection).

However, the examiner has provided no further explanation to support his conclusion.

Simply stating the principle "art recognized equivalent" without providing an explanation of its applicability to the facts of the case at hand is not sufficient to establish a prima facie case of obviousness. Appellants maintain that:

In order for an Examiner to rely on equivalents as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art. *In re Ruff*, 256 F.2d 590, 598, 118 USPQ 340, 347 (CCPA 1958). Further, rejections based on 35 U.S.C. § 103 must rest on a factual basis. In making such a rejection, the examiner has the initial duty of supplying the requisite factual basis and may not, because of doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

Applicants submit that the examiner has not provided the requisite factual basis or findings of fact to establish that the valve holder of Cadman et al is an art-recognized equivalent substitute valve housing assembly for the valve holder of Hirota et al. The examiner's conclusion that the valve holder of Cadman et al is an art-recognized equivalent substitute valve housing assembly for the valve holder of Hirota et al appears to be based on pure speculation or conjecture, not upon fact. "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at \_\_\_, 82 USPQ2d at 1396 quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

In as much as the examiner has neither supplied a factual basis or some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, the examiner's rationale in determining that the subject matter of the claims would have been obvious is flawed. Hence, the rejection should be reversed.

Nonetheless, appellants further submit that the valve holder of Cadman et al is not an art-recognized equivalent *substitute* valve housing assembly for the valve holder of Hirota et al for the following reasons:

Hirota et al, at col. 4, ll. 1-10, state:

In Fig. 3, spring seat member 20 has an annular restriction defining said restricted passage 22. It has a small cross-section area and is containing circumferentially distributed refrigerant passage holes 21. The refrigerant passing therethrough adiabatically expands on the downstream side of said restricted passage 22. An evaporator (not shown) is connected to the downstream side of the expansion valve 10, so that the refrigerant is introduced into the evaporator while being adiabatically expanded.

Thus, the valve holder of Hirota et al requires an annular restriction having a small cross-section containing circumferentially distributed refrigerant passage holes so that refrigerant passing therethrough adiabatically expands on the downstream side of the restricted passage for introduction into the evaporator while being adiabatically expanded.

As shown in Fig. 2 of the reference to Cadman et al, the cap 33, which is read by the examiner as the single piece valve holder, has only a single large outlet passage 34 for allowing fluid to pass therethrough. Nothing in Cadman et al suggests that the fluid passing through the single large outlet passage in the cap adiabatically expands on the downstream side of the

passage. To the contrary, appellants maintain that the large size of the outlet passage would preclude the fluid from adiabatically expanding on the downstream side of the passage.

Therefore, one skilled in the art would neither have recognized nor concluded that the valve holder of Cadman et al is an art-recognized equivalent *substitute* valve housing assembly for the valve holder of Hirota et al. Moreover, substituting the valve holder of Cadman et al for the valve holder of Hirota et al would destroy the operation function of the expansion valve of Hirota et al since the substituted valve holder would lack the annular restriction having a small cross-section containing circumferentially distributed refrigerant passage holes which enables the refrigerant passing therethrough to adiabatically expand on the downstream side of the restricted passage. Hence, the invention is not rendered obvious under 35 U.S.C. 103 and the rejection should be reversed.

In addition to the examiner not having provided the requisite factual basis to support his conclusion that the prior art valve holder of Cadman et al is an art-recognized equivalent, the examiner has not demonstrated via factual findings of fact why it would have been obvious to one of ordinary skill in the art to have substituted the *alleged* equivalent prior art valve holder of Cadman et al for the valve holder of Hirota et al. Thus, the rejection is deficient for this reason as well.

Finally, the combination of Cadman et al with the primary reference to Hirota et al does not make up for the shortcomings of Hirota et al since Cadman et al lack a disclosure or suggestion of an adjusting shim for adjusting the opening pressure of the valve as disclosed in paragraph [0021] of appellants' specification. The examiner reads element 47 in Cadman et al as

an adjusting shim, however, element 47 is a check valve situated in outlet chamber 38 for preventing flow of fluid under pressure from the chamber 38 to the chamber 37 (col. 3, ll. 40-42). Moreover, valve element 47 does not adjust the opening pressure of the valve as does the adjusting shim of the present invention (paragraph [0021] of appellants' specification).

Accordingly, for the reasons stated hereinabove, the rejection of claims 44 and 45 is not rendered obvious and should be reversed.

Claims 22, 23, 25, 29-31, 33-35

Appellant's discussion and arguments above with regard to the obviousness rejection of independent claims 44 and 45 apply equally to the obviousness rejection of independent claims 22 and 31. Aside from the fact that neither Hirota et al nor Cadman et al disclose or suggest a single piece valve piston and a single piece adjusting shim according to the present invention, appellants respectfully submit that the examiner erred in rejecting claims 22 and 31 since it would not have been obvious to provide the valve piston of Hirota et al with (1) at least one flat place on an outer cylindrical circumferential surface of the valve piston that extends over only a portion of the length of the valve piston as recited in claim 22 or (2) three flat places distributed uniformly over the circumference of the valve piston such that they extend parallel to the longitudinal axis of the valve piston as recited in claim 31.

On pgs. 4 and 5 of the Final rejection, mailed July 20, 2010, the examiner finds that Hirota et al as discloses grooves (spaces between guide legs 14c) on the outer cylindrical surface of the piston but fails to disclose flat places on the outer cylindrical surface of the piston.

Applicants submit that the examiner's reading of the guide legs 14c as a piston and the spaces between the guide legs as grooves on the outer cylindrical surface of the piston is misplaced. Hirota et al describes legs 14c of valve element 14 as being *guide* legs extending along the inner peripheral surface of the upstream-side passage 16a (col. 3, ll. 31-33). No mention is made in the reference that the guide legs 14c are a piston or function as a piston. Moreover, the spaces between the guide legs are not grooves, that is, narrow channels or depressions, on the outer cylindrical surface of a piston but are merely gaps or empty areas having no defined structure with an outer cylindrical surface.

The examiner relies on Fountain-Barber (Figs. 1-5) as teaching a valve piston 3 having four flat places 14 provided uniformly over the outer cylindrical circumference 15 of the piston that extend longitudinally in an axial direction of the piston.

The examiner concludes that it would have been obvious to provide the valve of Hirota et al with a valve piston having flat places inserted into the fluid passage portion of the valve insert, as taught by Fountain-Barber, as an art-recognized equivalent substitute fluid passage opening mechanism (pg. 5 of the Final rejection). However, the examiner has provided no further explanation to support his conclusion.

As previously noted, merely stating the principle "art recognized equivalent" without providing an explanation of its applicability to the facts of the case at hand is not sufficient to establish a prima facie case of obviousness. Appellants maintain that:

In order for an Examiner to rely on equivalents as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art. *In re Ruff*, 256 F.2d 590, 598, 118



USPQ 340, 347 (CCPA 1958). Further, rejections based on 35 U.S.C. § 103 must rest on a factual basis. In making such a rejection, the examiner has the initial duty of supplying the requisite factual basis and may not, because of doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

Applicants submit that the examiner has not provided the requisite factual basis or findings of fact to establish that the Fountain-Barber valve piston with flat places is an art-recognized equivalent substitute fluid passage opening mechanism for the spaced apart guide legs of Hirota et al. The examiner's conclusion that the Fountain-Barber valve piston with flat places is an art-recognized equivalent substitute fluid passage opening mechanism for the spaced apart guide legs of Hirota et al appears to be based on pure speculation or conjecture, not upon fact. "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at \_\_\_, 82 USPQ2d at 1396 quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

In as much as the examiner has neither supplied a factual basis nor some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, the examiner's rationale in determining that the subject matter of the claims would have been obvious is flawed. Hence, the rejection is improper and should be reversed.

In addition to the examiner not having provided the requisite factual evidence to support his conclusion that the Fountain-Barber valve piston with flat places is an art-recognized

equivalent substitute fluid passage opening mechanism for the spaced apart guide legs of Hirota et al, the examiner has not demonstrated via factual findings of fact why it would have been obvious to one of ordinary skill in the art to substitute the *alleged* equivalent Fountain-Barber valve piston with flat places for the spaced apart guide legs of Hirota et al. Appellants submit that, without the benefit of hindsight, one skilled in the art would not have found it obvious to substitute the Fountain-Barber valve piston with flat places for the spaced apart guide legs of Hirota et al because doing so would require a substantial reconstruction and redesign of the Hirota et al valve element, mainly because the spaces between the guide legs lack any defined structure having an outer cylindrical surface that would accommodate flat places. Thus, the rejection is improper and should be reversed.

Nevertheless, for the sake of argument, appellants further submit that even if it may have been obvious to substitute the Fountain-Barber valve piston with flat places for the spaced apart guide legs of Hirota et al, as suggested by the examiner, the resulting structure would not meet the limitations of claim 22 since Fountain-Barber does not disclose or suggest that the flat places extend over only a portion of the length of the valve piston, as claimed.

Fountain-Barber, at col. 2, ll. 21-32, disclose an anti-extrusion member 13 bonded to a valve member 12. The anti-extrusion member 13 includes an extension 14 extending from its face 19 that has a substantially square cross-section with rounded corners 15 as shown in Fig. 5. As appellants understand the rejection, the examiner reads the extension 14 as a valve piston and the flat surfaces of the extension 14 as the flat places provided on the outer cylindrical surface of the valve piston that extend in the axial direction of the valve piston, notwithstanding the

examiner's designation of element 3 as being a valve piston (pg. 4 of the final rejection).

However, as may be clearly seen from Fig. 4 of Fountain-Barber, the flat places extend over the *entire* length of the valve piston, not only over a portion of the length of the valve piston as recited in claim 22.

Appellants previously addressed this issue on pg. 11 of the amendment filed on June 16, 2010. However, on pg. 9 of the final rejection mailed July 20, 2010, the examiner took the position that appellants' arguments were not persuasive since the primary reference to Hirota et al disclose fluid passages in the valve piston that extend only on a portion of the valve piston.

Appellants submit that the examiner's argument is misplaced because the valve piston structure of Fountain-Barber is being substituted for the spaced apart guide legs of Hirota et al as evidenced by the statement in the rejection that the valve piston structure of Fountain-Barber is an art-recognized equivalent *substitute* fluid passage opening mechanism (pg. 5 of the final rejection). If one of ordinary skill in the art were to combine the teachings of Fountain-Barber with that of Hirota et al, the substituted valve piston structure would have flat places extending over the *entire* length of the valve piston since this is exactly what the reference to Fountain-Barber teaches. Thus, one of ordinary skill in the art, without the benefit of hindsight, would never have arrived at the subject matter defined in claim 22.

Finally, combining Fountain-Barber with Hirota et al and Cadman et al does not make-up for the shortcomings of Hirota et al, as discussed above. For instance, Fountain-Barber does not disclose or suggest an adjusting shim disposed between the valve piston and the compression spring as claimed.

Accordingly, one of ordinary skill in the art would not have arrived at the subject matter defined in independent claims 22 and 31. Hence, the rejection of claims 22, 31 and claims 23, 25, 29, 30 and 33-35, which depend from claim 31, should be reversed.

**Rejection under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Lauer et al (US 6,523,913)**

Claim 26 depends from claim 31 and further recites that the valve holder (1) and the valve insert (2) are calked to one another. The examiner cites Lauer et al for teaching a valve holder and a valve insert joined together by calking. Lauer et al do not solve the basic deficiencies in the combination Hopkins et al, Cadman et al and Fountain-Barber as previously discussed. Thus, even if it had been obvious to combine the teachings of Lauer et al with that of Hopkins et al, Cadman et al and Fountain-Barber, one of ordinary skill would not have arrived at the subject matter recited in claim 26.

**Rejection under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Jay et al (US 2,672,881)**

Claims 32 and 38 depend from claim 31. Appellants respectfully submit that claims 32 and 38 are additionally patentable because Hirota et al, as modified by Cadman et al and Fountain-Barber, fail to disclose (1) the flat places are oriented at an angle relative to the longitudinal axis of the valve piston and (2) an outflow conduit in the valve insert, and to provide Hirota et al with these features in view of the teachings of Jay et al would not have been obvious.

With respect to claim 32, the claim requires the flat places to be oriented at an angle relative to the longitudinal axis of the valve piston.

On pg. 6 of the final rejection, mailed July 20, 2010, the examiner cites Jay et al as teaching flat places uniformly distributed over the circumference of the piston and oriented at an angle relative to the axis of the valve. The examiner has not identified the elements which constitute the flat places however, appellants believe that the examiner is referring to the inclined flat planes 35 shown in Fig. 3 of the drawings.

The examiner concludes that it would have been obvious to provide Hirota et al, as modified by Cadman et al and Fountain-Barber, with flat places oriented at an angle relative to the axis of the valve, as taught by Jay et al, in order to gradually increase the flow area to increase the flow with increasing inlet pressure.

While Jay et al does teach that the flat places are uniformly distributed over the circumference of piston 26 and oriented at an angle relative to the axis of the valve (Fig. 2), there is no disclosure or suggestion in Jay et al that the inclined flat planes would gradually increase the flow area to increase the flow with increasing inlet pressure. As a matter of fact, the examiner has neither identified any objective teaching in the prior art nor referenced knowledge generally available to one skilled in the art that would have led that individual to combine the teachings of Jay et al with that of Hirota et al, Cadman et al and Fountain-Barber in order to gradually increase the flow area to increase the flow with increasing inlet pressure. Therefore, since the examiner has not provided a factual basis to support his rationale for combining the

prior art reference, appellants submit that the examiner's conclusion is based on speculation, unfounded assumptions or hindsight reconstruction.

Rejections based on 35 U.S.C. §103 must rest on a factual basis. In making such a rejection, the examiner has the initial duty of supplying the requisite factual basis and may not, because of doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967). Further, in rejecting claims as unpatentable on the basis of obviousness, the examiner must provide "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l. Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007).

Accordingly, since the examiner has neither provided the requisite factual basis nor some articulated reasoning with some rational underpinning to support his legal conclusion of obviousness, the rejection is improper and should be reversed.

Appellants further submit that the combination of the Jay et al reference with the Hirota et al reference, as modified by the references to Cadman et al and Fountain-Barber, is improper because the examiner has simply used appellants' claims as a blueprint to abstract bits and pieces of the prior art together, through hindsight, to make the § 103 rejection. It must be recognized that a combination of prior art is improper and not "obvious" if the only suggestion or reason for combining the teachings of the prior art is found in the present application. *In re Pye & Peterson*, 148 USPQ 426 ICCPA 1966).

Therefore, since the examiner has neither (1) identified any objective teaching in the prior art, (2) referenced knowledge generally available to one skilled in the art, or (3) supplied some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, it is submitted that, without the benefit of hindsight, one skilled in the art would not have considered modifying the valve of Hirota et al, as modified by Cadman et al and Fountain-Barber, to provide flat places oriented at an angle relative to the longitudinal axis of the valve as set forth in the claim. Accordingly, claim 32 is not rendered obvious and the rejection should be reversed.

As for claim 38, the claim requires an outflow conduit in the valve insert. On pg. 6 of the final rejection, the examiner cites Jay et al as teaching an outlet 22 in the valve insert and concludes that it would have been obvious to provide Hirota et al, as modified by Cadman et al and Fountain-Barber, with an outflow conduit in the valve insert, as taught by Jay et al, as an art recognized equivalent substitute location of the outlet conduit. However, the examiner has provided no further explanation to support his conclusion.

As previously discussed, merely stating the principle "art recognized equivalent" without providing an explanation of its applicability to the facts of the case at hand is not sufficient to establish a prima facie case of obviousness. Appellants maintain that:

In order for an Examiner to rely on equivalents as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art. *In re Ruff*, 256 F.2d 590, 598, 118 USPQ 340, 347 (CCPA 1958). Further, rejections based on 35 U.S.C. § 103 must rest on a factual basis. In making such a rejection, the examiner has the initial duty of supplying the requisite factual basis and may not, because of doubts that the

invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968).

Applicants submit that the examiner has not provided the requisite factual basis or findings of fact to establish that locating an outflow conduit in the valve insert (cylindrical case 12) of Hirota et al, as taught by Jay et al, would have been an art recognized equivalent substitute location of *the* outlet conduit. The examiner's conclusion appears to be based on pure speculation or conjecture, not upon fact. "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at \_\_\_, 82 USPQ2d at 1396 quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

Therefore, since the examiner has neither supplied a factual basis nor some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, the examiner's rationale in determining that the subject matter of the claims would have been obvious is flawed. Hence, the rejection is improper and should be reversed.

Moreover, the examiner has not demonstrated via factual findings of fact why it would have been obvious to one of ordinary skill in the art to have provided *the* outflow conduit in the valve insert of Hirota et al. Appellants submit that, without the benefit of hindsight, one skilled in the art would not have found it obvious to provide *the* outflow conduit in the valve insert (cylindrical case 12) of Hirota et al as an art-recognized equivalent substitute location of the



outlet conduit because doing so would (1) require a substantial reconstruction and redesign of the Hirota et al valve insert and (2) destroy the operational function of the Hirota et al expansion valve.

As clearly shown in Fig. 4 of Hirota et al, the valve insert portion (cylindrical case 12) of the expansion valve 10 is fitted into a refrigerant pipe 1 against a waist 1a with its outer cylindrical surface abutting the inner cylindrical surface of the pipe (col. 3, ll. 4-9). It is submitted that the refrigerant pipe 1 would severely impair, if not completely preclude, the flow of refrigerant from the outlet conduit without substantial reconstruction and redesign of the cylindrical case of Hirota et al. Moreover, substituting the location of *the* outlet conduit of Hirota et al to the cylindrical case, as the examiner suggests by the statement "art-recognized equivalent ***substitute location of the outlet conduit***" in the rejection, would destroy the operational function of the expansion valve since the refrigerant pipe would block the passage holes 21 thereby preventing the refrigerant from adiabatically expanding and being introduced in the evaporator while being adiabatically expanded as required by Hirota et al (col. 4, ll. 1-10). As stated in MPEP §2143.01(V):

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification."  
*In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Therefore, since providing the outlet conduit in the cylindrical case of Hirota et al, as proposed by the examiner, would result in passage holes 21 being blocked by the refrigerant pipe 1, appellants submit that the proposed modification would render the prior art invention being

modified unsatisfactory for its intended purpose. Accordingly, there is no suggestion or motivation to make the proposed modification. Hence, claim 38 is not rendered obvious by the combined teachings of Hirota et al, Cadman et al, Fountain-Barber and Jay et al, and the rejection should be reversed.

**Rejection under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Yie (US 5,241,986)**

Claims 27, 39, 41 and 42 depend from claim 31 and are patentable for same reasons claim 31 is patentable over the combination of prior art references. However, (1) claim 27 additionally recites that the valve holder and the valve insert are screwed together, (2) claim 39 further recites that the valve piston includes a piston rod which protrudes into the cup-shaped recess (partial chamber 1a) of the valve holder, (3) claim 41 adds that the compression spring concentrically surrounds the piston rod of the valve piston, and (4) claim 42 includes the further limitation that the adjusting shim is slipped onto the piston rod of the valve piston and rests there on a steplike seat.

On pg. 7 of the final rejection, the examiner cites Yie for teaching a piston rod 17 protruding into the cup-shaped recess of valve holder 11, a compression spring 22 surrounding the piston rod, and an adjusting shim 18 slipped onto the piston rod and resting on a steplike seat.

The examiner concludes that it would have been obvious to provide the valve of Hirota et al with a piston rod, as taught by Yie, in order to help align the piston and the spring.

With respect to claims 39, 41 and 42, it is respectfully submitted that the rationale stated by the examiner for combining the teachings of Yie with that of Hirota et al [as modified by Cadman et al and Fountain-Barber] is flawed since the examiner has articulated no findings of fact to establish that alignment of the piston and the spring was a problem that needed to be solved.

Appellants submit that the cylindrical part of the spring seat member 20 that receives the fixed end portion of the compression spring 18 (Figs. 1, 2 and col. 3, ll. 66-67), and the three supporting legs 14d protruding downstream and extending along the inner peripheral surface of the downstream-side passage 16b of the valve of Hirota et al (Figs. 1, 2 and col. 3, ll. 33-36) would sufficiently align the piston and the spring without the need for additional supporting structure. Thus, it would not have been recognized by one skilled in the art that alignment of the piston and the spring was a problem that needed to be solved. Hence, without any factual basis, the examiner's rationale appears to be based on pure speculation or conjecture. Accordingly, the rejection of claims 39, 41 and 42 is not rendered obvious and should be reversed.

**Rejection under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Lindeboom (US 3,346,009)**

Claim 40 depends from claim 31 and further recites that the compression spring is embodied as a conical spring. On pg. 7 of the rejection, the examiner cites Lindeboom for teaching a conical spring. Lindeboom does not solve the basic deficiencies in the combination Hopkins et al, Cadman et al and Fountain-Barber as previously discussed. Thus, even if it had

been obvious to combine the teachings of Lindeboom with that of Hopkins et al, Cadman et al and Fountain-Barber, one of ordinary skill would not have arrived at the subject matter recited in claim 40.

**Rejection under 35 U.S.C. 103(a) over Hirota et al (US 6,314,753) in view of Cadman et al (US 2,498,482), Fountain-Barber (US 3,199,533) and Platt et al (US 4,413,646)**

Claim 37 depends indirectly from 31, while claim 43 depends directly from claim 31. Appellants respectfully submit that claims 37 and 43 are additionally patentable because Hirota et al, as modified by Cadman et al and Fountain-Barber, fail to disclose that *the axis of the outflow opening [in the valve holder] is positioned at an angle relative to the longitudinal axis of the valve holder*, as recited in claim 37, or *the valve holder has an axis and the bore oriented at an oblique angle with respect to the axis of the valve holder*, as recited in claim 43, and providing Hirota et al with this feature would not have been obvious in view of the teachings of Platt et al.

On pg. 8 of the final rejection, mailed July 20, 2010, the examiner acknowledges that the combination of Hirota et al, Cadman et al and Fountain-Barber fail to disclose an outflow conduit at an oblique angle with respect to the axis of the valve holder.

The examiner cites Platt et al for teaching a valve comprising a valve holder housing having an oblique outlet in the valve holder housing to reduce erosion of the valve surface. However, the examiner has not identified the structural element(s) in Platt et al that constitutes the valve holder housing having an oblique outlet.

Nevertheless, the examiner concludes that it would have been obvious to a person of ordinary skill in the art to have provided the valve of Hirota et al with an oblique outlet, as taught by Platt et al, in order to reduce erosion of the valve surface.

This generalization of the teachings of Platt et al is clearly erroneous. In fact, applicants submit that Platt et al neither teaches nor suggests (1) an outflow conduit in a valve holder, wherein the axis of the conduit opening is positioned at an angle relative to the longitudinal axis of the valve holder or (2) a valve holder that has an axis and the bore is oriented at an oblique angle with respect to the axis of the valve holder.

Platt et al relates to a coal slurry letdown valve used in synthetic fuels processing (col. 3, ll. 22-23). The letdown valve 10 has a body portion 11 with a conduit 13 for the flow of coal slurry into the valve, and a conduit 17 from which coal slurry exits the valve (col. 3, ll. 26-28). A valve piston (plug 25) is movably disposed (arrows 24) in a direction coinciding with the longitudinal axis of the internal bore 31 of the cage 30 and the internal bore 39 of the body portion 11 for controlling the flow of coal slurry across neck 23 of throat 18 of the valve (col. 3, ll. 37-43). Since conduit 17 is the only conduit disclosed in Platt et al for the outflow of coal slurry from the valve, it clearly is the only conduit that can be read on the claimed outflow conduit. However, as shown in Fig. 1 of Platt et al, the axis of the outflow conduit opening is *not* positioned at an angle relative to the longitudinal axis of the valve holder, as recited in claim 37, and the bore is *not* oriented at an oblique angle with respect to the axis of the valve holder, as recited in claim 43. To the contrary, both the axis of the outflow conduit and the bore extend in a direction that coincides with the longitudinal axis of both the internal bore 31 of the cage 30 and

the internal bore 39 of the body portion 11. Thus, Platt et al does not make up for the deficiencies in Hirota et al, as modified by Cadman et al and Fountain-Baber. Therefore, the invention is not rendered obvious as required under 35 U.S.C. 103 since none of the references, individually or combined, disclose or suggest the recited structural arrangements of claims 37 and 43.

However, appellants' comments hereinabove notwithstanding, it is further submitted that combining the teachings of Platt et al with Hirota et al, Cadman et al and Fountain-Baber, for the purpose suggested by the examiner, i.e., to reduce erosion of the valve surface, would not have resulted in the invention recited in claims 37 and 43.

Platt et al teach that to reduce wear of the surface of the flow outlet 17, a removable retainer 20 (col. 2, ll. 31-35) lined with erosion-resistant material 22 is used (col. 3, ll. 34-36, col. 4, ll. 16-21 and Fig. 1). Thus, if one of ordinary skilled in the art were to actually combine the teachings of Hirota et al and Platt et al for the purpose suggested by the examiner, i.e., reducing erosion of the valve surface, the resulting structure would be a valve having an outflow conduit 22 in the valve holder 20, according to the teachings of Hirota et al, that would be lined with the removable wear resistant element 20, as taught by Platt et al. However, with the inclusion of the removable wear resistant element in the valve holder 20, the valve holder of Hirota et al would no longer be a single piece valve holder as required by the claims. Therefore, based on the examiner's rationale, one of ordinary skill in the art would never have arrived at the subject matter defined in appellants' claims 37 and 43. Accordingly, the invention is not rendered obvious as required under 35 U.S.C. 103 and the rejection should be reversed.

Applicants additionally submit that the rationale stated by the examiner for combining the teachings of Platt et al with Hirota et al, Cadman et al and Fountain-Baber is flawed since a person of ordinary skill in the art would not have been motivated to provide the valve of Hirota et al with an oblique outlet, as taught by Platt et al, in order to reduce erosion of the valve surface.

The invention in Hirota et al relates to a thermostatic expansion valve designed to control the flow rate of refrigerant being introduced into an evaporator. In col.3, ll. 10-21, Hirota et al disclose that a dust removing filter 11 is attached to the upstream side of the expansion valve to catch impurities, i.e., particulate matter, prior to the refrigerant reaching the restricted passage 22 in spring seat member 20. In other words, rubbish, etc. contained in the refrigerant is held back by the filter 11 and is prevented from flowing into the expansion valve or into the restricted passage 22 (col.3, ll. 10-21). Thus, Hirota et al is concerned with preventing particulate matter from flowing into the expansion valve and/or the restricted passage.

On the contrary, Platt et al is directed to a coal slurry letdown valve for use in a donor solvent coal liquefaction process (col. 1, l. 29). The coal slurry comprises coal particles dispersed in a hydrocarbon mixture. The coal slurry enters the letdown valve at approximately 2000 psi and passes through the throat of the valve where the pressure drops to approximately 80 psi (col. 3, ll. 16-22). The letdown valve is designed with wear resistant surfaces so that the valve can withstand the extreme conditions to which it is subjected (col. 2, ll. 9-15). Thus, Platt et al is concerned with extending the operating life of the letdown valve (col. 4, ll. 13-15), not with preventing particulate matter from flowing into and through the valve.

On pg. 8 of the Final Rejection, the examiner concludes that one skilled in the art would have been motivated to combine the teachings of Platt et al with that of Hirota et al in order to reduce erosion of the valve surface in Hirota et al.

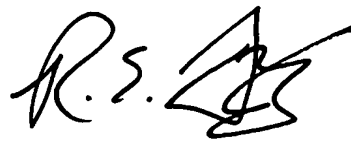
However, one skilled in the art would not have been motivated to combine the teachings of Platt et al with that of Hirota et al, based on the examiner's rationale, since Hirota et al prevents particulate matter from flowing into the restricted passage by using particulate filters. Thus, there would be no need to reduce erosion of the valve surfaces in Hirota et al since the problem of surface wear would not exist in Hirota et al. Therefore, the examiner's rationale for combining the teachings of Hirota et al and Platt et al does not support a conclusion of obviousness. Accordingly, the invention is not rendered obvious under 35 U.S.C. 103 and the rejection should be reversed.



Conclusion

For the reasons stated above, the appellants request that the Examiner's rejections of the claims be reversed.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'R.E. Greigg', with a stylized flourish at the end.

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### VIII - CLAIMS APPENDIX

Claims 1-21. **(Canceled)**

22. **(Rejected)** A pressure limiting valve (10), consisting of

a single piece valve holder (1),

a single piece valve insert (2) connected to the valve holder (1),

a single piece valve piston (3) supported slidably in the valve insert (2),

a compression spring, acting upon the valve piston (3) with a pressure force acting in the closing direction, and

a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (3), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a, 1b) merge with one another in steplike fashion, and wherein the subregion (16b) of the valve holder (1) embraces the valve insert (2) from the outside, so that the steplike transition of the valve holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert (2) and the valve holder (1), wherein the valve piston (3) has an end surface and a outer cylindrical circumferential surface, and at least one flat place (3a, 3a.1, 3a.2, 3a.3) is provided on

the outer cylindrical circumferential surface of the valve piston (3), and wherein the flat places (3a) extend over only a portion of the length of the valve piston (3).

23. **(Rejected)** The pressure limiting valve of claim 31, wherein the valve insert (2) has a cup-shaped recess (2a), in which the adjusting shim (4) is slidably supported.

Claim 24. **(Canceled)**

25. **(Rejected)** The pressure limiting valve of claim 31, wherein the first subregion (1a) of the valve holder (1) having the lesser inside diameter (D1) serves to receive the compression spring (5); and that the second subregion (1b) having the greater inside diameter (D2) embraces the valve insert (2) from outside.

26. **(Rejected)** The pressure limiting valve of claim 31, wherein the valve holder (1) and the valve insert (2) are calked to one another.

27. **(Rejected)** The pressure limiting valve of claim 31, wherein the valve holder (1) and the valve insert (2) are screwed together.

Claim 28. **(Canceled)**

29. **(Rejected)** The pressure limiting valve of claim 31, wherein the valve piston (3) has an end surface and a outer cylindrical circumferential surface, and at least one flat place (3a, 3a.1, 3a.2, 3a.3) is provided on the outer cylindrical circumferential surface of the valve piston (3).

30. **(Rejected)** The pressure limiting valve of claim 31, wherein three flat places (3a, 3a.1, 3a.2, 3a.3) are provided on the outer circumference of the valve piston (3), which flat places are distributed uniformly over the circumference of the valve piston (3).

31. **(Rejected)** A pressure limiting valve (10), consisting of

- a single piece valve holder (1),
- a single piece valve insert (2) connected to the valve holder (1),
- a single piece valve piston (3) supported slidably in the valve insert (2),
- a compression spring, acting upon the valve piston (3) with a pressure force acting in the closing direction, and
- a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (3), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a, 1b) merge with one another in steplike fashion, and wherein the subregion (16b) of the valve holder (1) embraces the valve insert (2) from the outside, so that the steplike transition of the valve

holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert (2) and the valve holder (1), wherein three flat places (3a, 3a.1, 3a.2, 3a.3) are provided on the outer circumference of the valve piston (3), which flat places are distributed uniformly over the circumference of the valve piston (3), and wherein the flat places (3a) are disposed on the valve piston (3) such that they extend parallel to the longitudinal axis of the valve piston (3).

32. **(Rejected)** The pressure limiting valve of claim 30, wherein the flat places (3a, 3a.1, 3a.2, 3a.3) are oriented at an angle relative to the longitudinal axis of the valve piston (3).

33. **(Rejected)** The pressure limiting valve of claim 31, wherein the adjusting shim (4) has a fluid-passable recess (4a).

34. **(Rejected)** The pressure limiting valve of claim 33, wherein the recess (4a) is disposed eccentrically.

35. **(Rejected)** The pressure limiting valve of claim 31, further comprising an outflow conduit (1c) in the valve holder (1).

Claim 36. **(Canceled)**

37. **(Rejected)** The pressure limiting valve of claim 35, wherein the axis (A) of the outflow opening is positioned at an angle relative to the longitudinal axis (A1) of the valve holder (1).
38. **(Rejected)** The pressure limiting valve of claim 35, wherein an outflow conduit (1c) is provided in the valve insert (2).
39. **(Rejected)** The pressure limiting valve of claim 31, wherein the valve piston (3) includes a piston rod (3b), which protrudes into the cup-shaped recess (partial chamber 1a) of the valve holder (1).
40. **(Rejected)** The pressure limiting valve of claim 31, wherein the compression spring (5) is embodied as a conical spring.
41. **(Rejected)** The pressure limiting valve of claim 39, wherein the compression spring (5) concentrically surrounds the piston rod (3b) of the valve piston (3).
42. **(Rejected)** The pressure limiting valve of claim 39, wherein the adjusting shim (4) is slipped onto the piston rod (3b) of the valve piston (3) and rests there on a steplike seat.
43. **(Rejected)** The pressure limiting valve of claim 31, wherein the valve holder has an axis and the bore is oriented at an oblique angle with respect to the axis of the valve holder.

44. **(Rejected)** A pressure limiting valve (10), consisting of

a single piece valve holder (1),

a single piece valve insert (2) connected to the valve holder (1),

a single piece valve piston (3) supported slidably in the valve insert (2),

a compression spring, acting upon the valve piston (3) with a pressure force acting in the closing direction, and

a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (3), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a, 1b) merge with one another in steplike fashion, and wherein the subregion (16b) of the valve holder (1) embraces the valve insert (2) from the outside, so that the steplike transition of the valve holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert (2) and the valve holder (1), wherein the valve insert (2) has a cup-shaped recess (2a), in which the adjusting shim (4) is slidably supported.

45. **(Rejected)** A pressure limiting valve (10), consisting of

a single piece valve holder (1),

a single piece valve insert (2) connected to the valve holder (1),

a single piece valve piston (3) supported slidably in the valve insert (2),

a compression spring, acting upon the valve piston (3) with a pressure force acting in the closing direction, and

a single piece adjusting shim (4) disposed between the valve piston (3) and the compression spring (5) such that the compression spring (5) is braced on one end on a bottom piece of the valve holder (1) and on the other on a face of the adjusting shim (4) facing away from the valve piston (3), wherein the valve holder (1) is cup-shaped and has at least two subregions (1a, 1b), each with a different inside diameter (D1, D2), and the subregions (1a, 1b) merge with one another in steplike fashion, and wherein the subregion (16b) of the valve holder (1) embraces the valve insert (2) from the outside, so that the steplike transition of the valve holder (1) formed by the different diameter regions (diameters D1, D2) is seated on and surrounds a portion of the valve insert (2) for establishing the connection between the valve insert (2) and the valve holder (1), wherein the valve insert (2) has a cup-shaped recess (2a), in which the adjusting shim (4) is slidably supported, wherein the diameter of the adjusting shim is greater than the diameter of the steplike transition so that the steplike transition holds the adjusting shim within the cup-shaped recess.



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In support of Appeal filed December 17, 2010

## IX - EVIDENCE APPENDIX

None

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X - RELATED PROCEEDINGS APPENDIX

None